Wafi Hassan

Equilibrium II

1) *Solve for T_1 and T_2.*

$T_1\cos(30) = T_2\cos(50)$

$T_1 = \dfrac{2T_2\cos(50)}{\sqrt{3}}$

$T_1\sin(30) + T_2\sin(50) = 688$

$\Rightarrow \dfrac{T_1}{2} + T_2\sin(50) = 688$

$\Rightarrow \dfrac{T_2\cos(50)}{\sqrt{3}} + T_2\sin(50) = 688$

$\Rightarrow T_2\left(\dfrac{\cos(50)}{\sqrt{3}} + \sin(50)\right) = 688 \Rightarrow T_2 = \dfrac{688}{\frac{\cos(50)+\sqrt{3}\sin(50)}{\sqrt{3}}}$

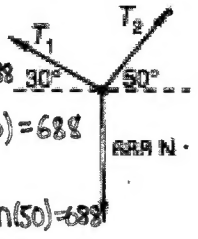
$\therefore T_2 = 605\ N$

$\dfrac{T_1}{2} + 605\sin(50) = 688$

$\Rightarrow \dfrac{T_1}{2} = 688 - 605\sin(50)$

$\therefore T_1 = 2(688 - 605\sin(50)) = 449.1\ N.$

$\therefore T_1 = 449.1\ N$



2) *Solve for T_1 and T_2*

$T_1\cos(29) = T_2\cos(44)$

$T_2 = \dfrac{T_2\cos(44)}{\cos(29)}$

$T_1\sin(29) + T_2\sin(44) = 488$

$\Rightarrow T_2\left[\dfrac{\cos(44)\sin(29)}{\cos(29)} + \sin(44)\right] = 488$

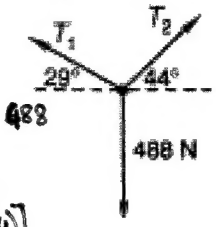
$\Rightarrow T_2 = \dfrac{488}{\left[\frac{\cos(44)\sin(29)}{\cos(29)} + \sin(44)\right]}$

$\therefore T_2 = 446.3\ N$

$T_1 = \dfrac{T_2\cos(44)}{\cos(29)}$

$= \dfrac{446.3\cos(44)}{\cos(29)}$

$\therefore T_1 = 361.1\ N$



3) *Solve for T_1 and T_2*

$T_1 = \dfrac{W\cos(T_2)}{\sin(T_1+T_2)}$

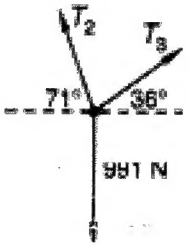
$= \dfrac{991\cos(36)}{\sin(71+36)}$

$\therefore T_2 = 838.4\ N$

$T_2 = \dfrac{W\cos(T_1)}{\sin(71+36)}$

$= \dfrac{991\cos(71)}{\sin(107)}$

$\therefore T_3 = 337.4\ N$



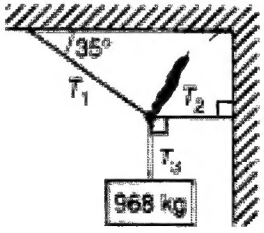
4) *Solve for T_1 and T_2*

$T_1 = \dfrac{9496\cos(0)}{\sin(0+35)}$

$T_1 = 16555.8\ N$

$T_2 = \dfrac{9496\cos(35)}{\sin(0+35)}$

$\therefore T_2 = 13541.4\ N$



$T_3 = 9496\ N\ (9.81\ m/s^2)$

5) *Solve for T_1 and T*

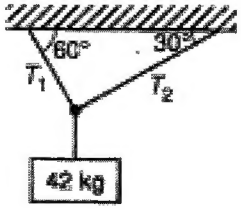
$T_1 = \dfrac{412\cos(30)}{\sin(90)}$

$= 412\cos(30)$

$= 356.8\ N$

$T_2 = 412\cos(60)$

$= 206\ N$



412.02 N